

Claims

1. A method for serving local energy loads, comprising the steps of:
 - (a) providing a remote central controller;
 - 5 (b) providing a local site controller in communication with at least one installed local power generation device and with said remote central controller;
 - (c) receiving, by said remote central controller, actual operating conditions pertaining to said at least one local generation device;
 - (d) determining, by said central controller, at least one optimal operating value for said
10 device based on at least one operating factor pertaining to said device;
 - (e) conveying, by said central controller, a recommendation and expected operating conditions based on said at least one value to said local site controller;
 - (f) determining by said site controller, based on at least one local operating factor, whether to adjust said command; and
 - 15 (g) delivering, by said site controller, either said command or an adjusted command to said at least one generation device.
2. The method of claim 1 wherein said at least one operating factor is a factor from the group consisting of:
20 part load efficiency characteristics, capacity, output level, grid-connection status, temperature de-rating of equipment, load following requirements, reserve margin, n-1 requirements, start-up costs, hour of operation, running status, forecasted thermal load, forecasted electrical load, maintenance costs, fuel costs, grid price, thermal capacity costs.
- 25 3. The method of claim 1 wherein said at least one local operating factor is a factor from the group consisting of:
 load following requirements, reserve margin, n-1 requirements, forecasted thermal load, forecasted electrical load, actual operating conditions.
- 30 4. The method of claim 2 wherein the determination of step (d) is based on a plurality of said factors at substantially the same time.

5. The method of claim 1 wherein said step (f) includes determining a value for said operating factor in real-time.

6. The method of claim 1 including the step of providing a user interface in communication with
5 said central controller or said site controller for configuring said central controller or said site controller.

7. The method of claim 1 wherein said step of providing a local site controller includes
10 providing a plurality of local site controllers in communication with at least one respective installed local power generation device.

8. A system for serving local energy loads, comprising:
a remote central controller;
a local site controller in communication with at least one installed local power generation
15 device and with said remote central controller;
means associated with said central controller for receiving actual operating conditions pertaining to said at least one local generation device;
means associated with said central controller for determining at least one optimal
operating value for said device based on at least one operating factor pertaining to said device;
20 means for conveying a command based on said at least one value to said local site controller;
means associated with said site controller for determining whether to adjust said command; and
means associated with said site controller for delivering either said command or an
25 adjusted command to said at least one generation device.

9. The system of claim 8 wherein said at least one operating factor includes a factor from the group consisting of:
30 part load efficiency characteristics, capacity, output level, grid-connection status, temperature de-rating of equipment, load following requirements, reserve margin, n-1

requirements, start-up costs, hour of operation, running status, forecasted thermal load, forecasted electrical load, maintenance costs, fuel costs, grid price, thermal capacity costs.

5 10. The system of claim 9 wherein a plurality of said factors is determined at substantially the same time.

11. The system of claim 8 wherein said means for determining whether to adjust said command includes means for determining a value for at least one local operating factor in real-time.

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12. The system of claim 8 including a user interface in communication with said central controller or said site controller for configuring said central controller or said site controller.

13. The system of claim 8 including a plurality of local site controllers in communication with at
15 least one respective installed local power generation device.

14. A method for determining optimal dispatch schemes for an on-site power generation arrangement, said arrangement including at least one generation unit, comprising the steps of:

20 (a) receiving forecasted electric or thermal load information associated with said on-site power generation arrangement; and

(b) determining at least one suitable operating point for said at least one generation unit to serve the forecasted load, said determining step including the step of determining a reliability factor associated with serving said load,

25 wherein said step of determining a reliability factor includes the step of determining at least a temperature de-rating of said at least one unit, a load following requirement, percentage of output capacity, unit availability, a reserve margin, or a unit running status.

15. The method of claim 14 wherein step (a) includes receiving forecasted electric and thermal
30 load information.

16. The method of claim 14 including the further step of:

(c) determining an optimal economic operating point for said at least one unit in said arrangement, including determining conditions for meeting electric load requirements and levelizing hours of operation.

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17. The method of claim 14 wherein said forecasted electric or thermal load information is determined by past load trends and current conditions associated with said arrangement.

18. The method of claim 14 wherein said arrangement includes a plurality of generation units, and wherein said step of determining at least one suitable operating point includes determining at least one suitable operating point for each of said plurality of generation units.

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19. The method of claim 18 wherein said step of determining at least one suitable operating point includes the step of determining a plurality of suitable operating points, and wherein said method includes the further step of ranking said suitable operating points for each of said plurality of generation units.

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20. In a system for serving local energy needs, said system including an on-site power generation arrangement including at least one power generation unit, said system further including a remote controller for determining at least one operating point for said at least one power generation unit, a site controller for controlling operation of said arrangement, said controller comprising:

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means for receiving remote dispatch commands associated with said arrangement from said remote controller, said remote dispatch commands including at least operating point information for said arrangement, said operating point information being determined by forecasted thermal or electric load information available to said remote controller; and

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means for determining appropriate unit-level dispatch commands based on said unit type and determined real-time site conditions associated with said at least one unit, including at least the unit's output, grid draw, load demand, unit status, and grid connection status.

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21. The site controller of claim 20 further comprising:

means for converting generic control data associated with said dispatch commands into unit type-specific control data;

means for converting unit type-specific control data into at least one physical signal

5 based on said unit type communication protocol; and

means for delivering said at least one physical signal to said at least one unit.

22. A method for determining optimal dispatch schemes for an onsite power generation

10 arrangement having at least one power generation unit, comprising the steps of:

determining whether there is a currently active command for said arrangement;

upon there being at least one unit with an active command,

determining a device level dispatch value;

15 upon all specified devices being available and dispatched within capacity,

setting specified-device level output levels to the active command recommendation;

determining the total on-site generation requirement; and

adjusting specified device output levels to accommodate for differences;

20 and

upon said arrangement being grid isolated, ensuring specified reserve margin is met; and

compiling and sending at least one dispatch message to said at least one power generation unit in said arrangement.

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23. A method for determining optimal dispatch schemes for an onsite power generation arrangement having at least one power generation unit, comprising the steps of:

determining whether there is a currently active command for said arrangement;

upon there being no unit with an active command, or upon there being at least one unit with an active command but wherein all specified devices are either not available or not dispatched within capacity,

determining site level values;

5 determining total on-site generation requirements;

upon said generation requirement being less than the site minimum,

dispatching all units to shut down and compiling and sending said dispatch message to said units;

10 upon there being at least one available dispatched generator and no capacity to serve the determined requirement,

determining whether the site is grid-connected;

upon being grid-isolated,

dispatching all generation units to shut down;

upon being grid-connected,

15 dispatching all generation units to operate at maximum capacity;

and

compiling and sending at least one dispatch message to a power generation unit;

20 upon there being at least one available dispatched generator and capacity to serve said determined requirement available,

determining available devices to dispatch;

dispatching according to part-load distribution; and

compiling and sending at least one dispatch message to a power generation unit;

25 upon all dispatched generation units being unavailable;

determining devices necessary to serve said determined requirement;

upon said dispatched units being determined able to serve said requirement,

dispatching according to part-load distribution; and

30 compiling and sending at least one dispatch message to a power generation unit;

upon dispatched units not units being determined able to serve said
requirement,

determining whether the site is grid connected, and

upon said site being grid connected,

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dispatching all dispatched units to operate at max capacity;

upon said site being grid isolated,

attempting to start additional units to meet said

requirement; and

compiling and sending at least one dispatch message to a power generation unit.

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